UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte MOHAMMAD A. ABDALLAH, VLADIMIR PENTKOVSKI

Appeal No. 2006-1169
Application No. 10/005,728

ON BRIEF

Before THOMAS, KRASS and BLANKENSHIP, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 16-18, 21-24, 26-31, 33-37, and 39-44.

The invention is directed to an apparatus for reducing the amount of silicon area required to implement a packed sum of absolute differences (PSAD) instruction without increasing the time required to compute the PSAD. The invention takes advantage of circuitry used to perform other single instruction multiple data (SIMD) operations such that only a relatively small amount of additional circuitry is needed to provide the PSAD instruction.

Representative independent claim 16 is reproduced as follows:

16. A processor comprising:

a decode unit to decode a plurality of packed data instructions including a packed sum of absolute differences (PSAD) instruction having a first format to identify a first set of packed data, and a packed multiply-add (PMAD) instruction having a second format to identify a second set of packed data, said decode unit to initiate a first set of operations on the first set of packed data responsive to decoding the PSAD instruction and to initiate a second set of operations on the second set of packed data responsive to decoding the PMAD instruction; and

an execution unit to perform a first operation of the first set of operations initiated by the decode unit and to perform a second operation of the second set of operations initiated by the decode unit.

The examiner relies on the following references:

Lee	5,721,697	Feb. 24, 1998
Sidwell	5,859,789	Jan. 12, 1999 (Filed July 10, 1996)

Sun Visual Instruction Set (VIS™) User's Guide, Sun Microsystems March 1997. (Sun)

Intel Pentium ™ Processor Family Developer's Manual, Volume 3 Architecture and Programming Manual 1995.

TESS Printout from Trademark Electronic Search System showing PENTIUM as a registered trademark of the Intel Corporation May 3, 1994.

Lee(2) Subword Parallelism with MAX-2 August 1996.

Claims 17, 26-31, and 33-37 stand rejected under 35 U.S.C. §112, second paragraph, because the trademark PENTIUM is recited in the claims.

Claims 16-18, 21-24, 26-31, 33-37, and 39-44 stand rejected under 35 U.S.C. §103. As evidence of obviousness, the examiner offers Sidwell and Sun with regard to claims 16-18, 26-31, 35-37, and 39-42, adding Lee to this combination with regard to claims 21-24, 33, 34, 43, and 44.

Reference is made to the brief and answer for the respective positions of appellants and the examiner.

OPINION

Turning, first, to the rejection based on the second paragraph of 35 U.S.C. §112, the examiner contends that claims 17, 26-31, and 33-37 are indefinite because they recite the trademark PENTIUM, citing MPEP §2173.05(u) for the propostition that a trademark identifies a source of goods, and not the goods themselves. From this, the examiner determines that the claims are indefinite because the claim scope is uncertain due to the trademark PENTIUM failing to identify any particular material or product.

The examiner contends that there are at least ten different processors produced by the Intel corporation that carry the trademark PENTIUM but that also contain slightly different instruction sets (answer-page 6).

Appellants argue that they are not claiming PENTIUM as a description of a particular material or product but, rather, they are claiming "instructions of a PENTIUM microprocessor

instruction set" which, according to appellants, "is descriptive of the source of a publicly disclosed microprocessor instruction set…associated with that particular source" and "a well established *de facto* standard of compatibility" (brief-page 12).

Appellants attempt to distinguish this use of PENTIUM from the use of the trademark HYPALON in Ex parte Simpson, 218 USPQ 1020 (Bd. App. 1982) wherein HYPALON was used as a noun to describe the physical and/or other properties of a material and the Board found that the claim scope was uncertain as regards the materials which forms HYPALON. Appellants argue that in the instant claims, PENTIUM is used as an adjective descriptive of the source of a well known, publicly disclosed, microprocessor instruction set (brief-page 13).

In accordance with the second paragraph of 35 U.S.C. §112, the claims must provide those who would endeavor, in future enterprise, to approach the area circumscribed by the claims of a patent, with the adequate notice demanded by due process of law, so that they may more readily and accurately determine the boundaries of protection involved and evaluate the possibility of infringement and dominance. In re Hammack, 427 F.2d 1378, 1382, 166 USPQ 204, 208 (CCPA 1970).

If the meaning of PENTIUM or a "PENTIUM microprocessor instruction set" is subject to change, it would appear that those who would endeavor, in future enterprise, to approach the area

circumscribed by claims such as the instant claims, would not have adequate notice of the metes and bounds of the claimed subject matter.

The examiner contends that there are at least ten different processors produced by the Intel corporation that carry the trademark PENTIUM but that also contain slightly different instruction sets. Appellants' response (at page 16 of the brief) is that appellants disagree that these particular microprocessors "contain wholly different instruction sets" and that a claim is not indefinite simply because it covers a number of possible embodiments. Thus, appellants do not deny that a "PENTIUM microprocessor instruction set" may have at least slightly different meanings. That is, the recitation of a "PENTIUM microprocessor instruction set" does not identify one and only one material or product, i.e., the recitation has no fixed and definite meaning since the microprocessor instruction set may differ, if only slightly, from PENTIUM product to PENTIUM product.

Since the artisan can never be sure exactly what product is being referenced by the claim recitation, we agree with the examiner that claims 17, 26-31, and 33-37 are indefinite, within the meaning of 35 U.S.C. §112, second paragraph.

While it is true that a claim may not be indefinite simply because it covers a number of possible embodiments, the claim

must still be specific enough so that one is instructed as to just what those embodiments so covered include. In the instant case, it is not clear what microprocessor instruction sets are covered. Is it the microprocessor instruction set for the PENTIUM II product or the microprocessor instruction set for the PENTIUM III product, for example? What if Intel employs its trademark PENTIUM to describe an entirely different type of microprocessor in the future? Will the instant claims cover that possibility? If so, what kind of adequate notice would one have as to what the instant claim language covers now and/or in the future?

These questions all point us in the direction of indefiniteness as to the instant claimed subject matter.

Accordingly, we will sustain the rejection of claims 17, 26-31, and 33-37 under 35 U.S.C. §112, second paragraph.

We turn now to the rejections under 35 U.S.C. §103.

With regard to independent claims 16, 26, and 39, the examiner contends that the combination of Sidwell and Sun would have made the claimed subject matter obvious, within the meaning of 35 U.S.C. §103.

Taking claim 16 as exemplary, the examiner provides a table at pages 7-8 of the answer, wherein the alleged correspondence between the claim language and the reference disclosures are listed. The examiner concludes that it would have been obvious

"to have combined Sun's packed sum of absolute differences (PSAD) instruction into Sidwell's system because Sidwell taught that the packed arithmetic unit was designed to perform additional operations (col. 5 lines 15-22) and Sun taught that a packed sum of absolute differences (PSAD) instruction was beneficial in accelerating motion compensation to support real-time video compression (pg. 88)."

The examiner also cites Lee as "extrinsic evidence of the general level of knowledge of one of skill in the art at the time of the invention" (answer-page 7). That knowledge is alleged to be "that packed data operations such as that disclosed by Sidwell, were known to be useful for and known to be utilized for performing media processing, such as video processing, which is a stated purpose for Sun's disclosed instruction" (answer-page 8, referring to Lee at column 2, lines 23-47).

The examiner alleges that "[b]ecause it was known…that subword parallelism as detailed by Sidwell was useful for video processing, one of skill in the art would have further been motivated to include Sun's disclosed vis_pdist() instruction into a system such as Sidwell's to further enhance it's [sic, its] performance as a media processor, such as for processing digital video data" (answer-page 9).

Appellants' position, with regard to claims 17 and 26-29, is that the combination of Sidwell and Sun would not result in the

claimed invention because the references each of the references requires three operands while the claimed decoder of instructions of the PENTIUM microprocessor instruction set does not use a third operand (brief-pages 20-22). Appellants also argue that Sun computes an accumulation of current and prior absolute differences rather than a sum of the absolute differences on a first identified set of packed data, while there is no accumulation of prior absolute differences in what appellants have done. Appellants conclude that "an absence in the claimed invention of the expected accumulation of prior absolute differences from the combined system of Sidwell and Sun is evidence of nonobviousness" (brief-page 22)

Additionally, appellants argue that "Sun teaches away from an implicit source that is also the destination register, which is precisely the technique employed in the implicit-operand IMUL instructions, of the PENTIUM microprocessor instruction set" (brief-page 23).

Moreover, appellants argue that

> ...Sidwell's system provides no path for an accumulator input to packed arithmetic unit 6, either from result bus 56 or as a third source operand to packed arithmetic unit 6...Therefore, Sidwell's system could not perform Sun's packed sum of absolute differences without significant modifications to permit a third source operand for packed arithmetic instructions. Appellant respectfully submits that no suggestion for such modifications is provided by Sidwell; and even if the modifications were made to Sidwell to permit a third source operand for packed arithmetic instructions, it would be nonobvious, without the aid of appellant's disclosure to view the prior art in

> retrospect, to perform an operation requiring such a third source operand but using only a two-operand opcode format as in the PENTIUM microprocessor instruction set (brief-page 24).

Initially, we note that appellants' arguments regarding two versus three operands, the accumulation of prior absolute differences, and the absence of such in the instant claimed invention, as well as IMUL instructions, of the PENTIUM microprocessor instruction set, are not persuasive as they relate to features not appearing in the claims. Also, we find it hard to base patentability on what is "absent" from a claim. Presumably, appellants base these arguments on well known features of the "PENTIUM microprocessor instruction set."

In any event, we will summarily reverse the rejection of claims 17, 26-31, and 33-37 based on U.S.C. §103. Since these claims contain the PENTIUM limitation and we have held supra that these claims are indefinite under U.S.C. §112, second paragraph, the application of prior art to the claims would be speculative. One cannot apply art under 35 U.S.C. 103 if claim interpretation is confusing under 35 U.S.C. 112, second paragraph. In re Steele, 305 F.2d 859, 134 USPQ 292, 295 (CCPA 1962).

By making this technical reversal of the prior art based rejection of claims 17, 26-31, and 33-37, we do not mean to imply that the art relied upon by the examiner would not be relevant relative to claims of the present scope containing definite limitations. In re Steele.

With regard to independent claims 16 and 39, we will not sustain the rejection of these claims under 35 U.S.C. §103 since we find that the examiner has not presented a prima facie case of obviousness with regard to the claimed subject matter.

Claim 16 requires one instruction (a PSAD instruction) having a first format to identify a first set of packed data; and a second instruction (a PMAD instruction) having a second format to identify a second set of packed data. The recited decode unit then initiates a first set of operations on the first set of packed data responsive to decoding the PSAD instruction; and initiates a second set of operations on the second set of packed data responsive to decoding the PMAD instruction.

Claim 39 recites only the PSAD instruction having a first format to identify a first set of packed data and the initiation of a first set of operations on the first set of packed data responsive to decoding the PSAD instruction. Claim 39 then specifies what the first set of operations comprises, including a packed subtract and write carry (PSUBWC) operation; a packed absolute value and read carry (PABSRC) operation; and a packed add horizontal (PADDH) operation.

Now the examiner admits that Sidwell does not disclose a PSAD instruction, relying on Sun for this teaching. Sun teaches an instruction vis_pdist(), which has as its function "Compute the absolute value of the difference between two pixel pairs"

(page 87). Presuming that this is a fair teaching of a PSAD (packed sum of absolute differences) instruction and that such an instruction, per se, was well known, neither of which is denied by appellants, we are unconvinced of any reasonable basis for the artisan to have included such an instruction in the Sidwell system.

The examiner explains that a PSAD instruction "was beneficial in accelerating motion compensation to support real-time video compression (pg. 88)" (answer-page 8) and refers to Lee as general knowledge in the art that packed data operations "were known to be useful for and known to be utilized for performing media processing, such as video processing, which is a stated purpose for Sun's disclosed invention" (answer-page 8).

While a PSAD instruction may have been known to be generally "useful," we find no suggestion in the applied references that the specific PSAD instruction would have been "useful" in Sidwell. What is the specific use to which the artisan would have put the PSAD instruction in Sidwell? The examiner only intimates that it would be useful for "accelerating motion compensation to support real-time video compression" (answer-page 8) but it is not clear that Sidwell needs, or would benefit from, such compensation or compression. Moreover, it is not clear how, or why, the artisan would have specifically applied the PSAD instruction in Sidwell's system such that the PSAD instruction

would have a first format to identify a first set of packed data. Moreover, Sidwell would need to also disclose a second instruction (a PMAD instruction) having a second format to identify a second set of packed data. Then, the recited decode unit (identified by the examiner as element 16 in Sidwell) would need to initiate a first set of operations on the first set of packed data responsive to decoding the PSAD instruction; and initiate a second set of operations on the second set of packed data responsive to decoding the PMAD instruction. It appears to us that a substantial modification would be necessary to Sidwell in order to arrive at the instant claimed subject matter, a modification which could only have been suggested by appellants' disclosure.

The examiner indicates that the artisan would have added the PSAD instruction to Sidwell because Sidwell allegedly indicates, at column 5, lines 15-22 (see page 8 of the answer) that the packed arithmetic unit was designed to perform "additional operations." While we do not find an explicit disclosure of the examiner's allegation, to the extent that it is true, it is still not clear to us why a PSAD instruction would have been suggested to be one of those alleged "additional operations."

Even if the prior art might be said to have suggested a PSAD instruction in Sidwell, there is still more to the claim requirements. The examiner notes that it would have been

"inherent" that any such PSAD instruction would have a "first format" and that this first format would have been different then the format of a different instruction (see page 7 of the answer). It is not clear to us that the formats for different instructions must, of necessity, be different.

But, even if we presume that a PSAD instruction would have been suggested for use in Sidwell and that it would have a format different from the format of other instructions, claim 16 still requires two different, very specific, instructions, having different formats, wherein a decode unit initiates two different sets of operations on the two different sets of packed data, each responsive to a different one of the instructions (one responsive to the PSAD instruction and one responsive to the PMAD instruction). We find no suggestion of this very specific claim limitation in the applied references, and we find it to be a stretch, far beyond the dictates of 35 U.S.C. §103, to conclude that this subject matter would have been obvious in view of the evidence provided by Sidwell and Sun.

With regard to claim 39, this claim calls for a specific set of operations. We find nothing in the combination of Sidwell and Sun suggesting a decode logic to initiate a first set of operations on a first set of packed data responsive to decoding a PSAD instruction, wherein the first set of operations comprise a packed subtract and write carry (PSUBWC) operation; a packed

absolute value and read carry (PABSRC) operation; and a packed add horizontal (PADDH) operation.

The examiner's rationale is based heavily on "inherency." At page 13 of the answer, the examiner alleges that when adding Sun's PSAD instruction, the decoding system would have been "inherently" responsible for controlling the PSAD instruction execution in the same manner as for controlling all other functions. In explaining why Sun allegedly discloses a packed subtract and write carry operation, the examiner states that subtraction operations "inherently" generate carries (page 13 of the answer). Similarly, without pointing specifically to a disclosure in Sun, the examiner concludes that Sun discloses the claimed PABSRC and PADDH operations (see the table at page 13 of the answer). In our view, the examiner bases the rejection too much on what is supposed to be "inherent," without showing why these alleged inherencies must necessarily be so, and too much on speculation, as to the types of operations that Sun "must" be doing.

A proper rejection under 35 U.S.C. §103 may not be based on speculation and probabilities or possibilities, but must provide some solid reasoning, based on evidence provided by the applied references and knowledge of the skilled artisan, as to why the prior art suggests the claimed subject matter. In our view, the

examiner's rationale in the instant case does not pass that test for obviousness.

Accordingly, we will not sustain the rejection of claims 16 and 39, and therefore, claims 18 and 40-42, under 35 U.S.C. §103.

Since independent claim 23 has similar limitations and more, and Lee does not provide for the deficiencies of Sidwell and Sun, we also will not sustain the rejection of claims 21, 22, 24, 43, and 44 under 35 U.S.C. §103.

We have sustained the rejection of claims 17, 26-31, and 33-37 under 35 U.S.C. §112, second paragraph, but we have not sustained the rejection of claims 16-18, 21-24, 26-31, 33-37, and 39-44 under 35 U.S.C. §103.

Accordingly, the examiner's decision is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136 (a). See 37 CFR § 1.136 (a) (1) (iv).

AFFIRMED-IN-PART

JAMES D. THOMAS
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